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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/713,177	11/15/00	ERIKSON G	E1047/20048

003000
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HM12/0404

EXAMINER	
CHUNDURU, S	
ART UNIT	**PAPER NUMBER**
1656	3

DATE MAILED: 04/04/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/713,177	ERIKSON ET AL.	
	Examiner	Art Unit	
	Suryaprabha Chunduru	1656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

1. The Information Disclosure Statement (Paper No.2) filed on December 15, 2000 has been entered and considered.

2. The Disclosure is objected because of the following informalities:

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because the Oath / Declaration is not in permanent ink.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 41 and 62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention because the claims 41 and 62 recite the terms 'homogeneous' and 'electrical circuit' which are vague and unclear because they does make the invention uncertain for not clearly point out what the terms mean to accomplish for.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-13, 15-17, 19-44, 47-58, 60, 62-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duck et al. (USPN. 5,660,988) and in view of Dervan et al. (USPN. 5,874,555).

Duck et al teach a method and composition for catalytic hybridization wherein they disclose that the hybridization cocktail comprises a target nucleic acid molecule with a probe containing a scissile linkage, and is complementary to the target nucleic acid and an excising agent (an enzyme) capable of cleaving the nucleic acid probe at the scissile linkage after formation of the target / probe hybrid (see column 2, line 19-37). They also disclose that (i) the nucleic acid probe could contain RNA, DNA and interspersed sequences as modified DNA or RNA (see column 8, 45-53); (ii) The target nucleic acid may be selected from diploid, polyploid organism or haploid cells (see column 2, lines 62-65); (iii) scissile linkage comprises from about 2 to about 100 nucleotides and the nucleic acid probe comprises from about 0 to 20 nucleotides or more (see column 8, lines 42-45); (iv) the excising enzyme is RNase H (see column 8, lines 54-62); the probe-target detection includes detectable markers such as fluorescent,

chemiluminescent, ligand (biotin) and radiolabelled molecules (see column 9, lines 45-56); (v) the nucleic acid probe may be immobilized on a solid support (see column 9, lines 56-57); (vi) the probes could be chimeric and comprise base labile phosphoramidates such as N-base protected, cyanoethyl, or 2'-OH sugar protected phosphoramidates (see column 10, lines 49-62); a suitable tether may be covalently attached to the amino-modified oligonucleotide probe to facilitate attachment to and function of the excising agent (see column 13, lines 15-21); the probe and target nucleic acid could be double-stranded or single stranded (see column 16, lines 50-67); the incubation temperature for the reaction is typically from about 60^0 c to about 70^0 C and the pH is 7.5 to 8.1 and the incubation time maybe from about 5 to 60 minutes or longer (see column 16, lines 24-38). However, they did not teach formation of multiplex structure and promoter of the probe.

Dervan et al. teach triplex structure formation by the method of hybridization of nucleic acid and oligonucleotide probes wherein they disclose that (i) the DNA may be obtained from genomic DNA (see column 6, lines 25-27) was hybridized with oligonucleotide probes equipped with DNA cleaving moiety (promoter) which includes oligonucleotide-EDTA-Fe, where EDTA is a chelator and Fe is a transition element having valency grater than one or chelator (EDTA) attached to intercalator methidium (see column 2, lines 43-52, column 1, lines 44-56 and column 10, lines 9-29); (ii) a portion of the triple helix structure is synthetic (see column 9, lines 28-35); (iii) the chelators or other cleavage moieties do not disrupt the hydrogen-base pair bonding (Watson-crick base pairing) between DNA or RNA sequences during triple helix formation (see column 10, lines 30-37); (iv) triplex formation could be analyzed by applying electrical force such as gel electrophoresis (see column 11, lines 19-26); (v) the oligonucleotide probe bind

either in major or minor grove of the target nucleic acid depending on the symmetry of the cleavage pattern (see column 13, lines 13-26 and column 1, lines 44-56).

Therefore, it would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made, to modify a method of catalytic hybridization with triple helix formation to achieve expected advantage of identification of nucleic acid sequence or variation in it. The motivation for this would have been an approach to detect formation of multiple helix structures in hybridization assays.

Claims 14, 18, 45-46, 59 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duck et al. (USPN. 5,660,988) and in view of Dervan et al. (USPN. 5,874,555) as applied to claims 1-13, 15-17, 19-44, 47-58, 60, 62-63 above, and further in view of Pinter et al. (USPN. 5,888,739) and Walder et al. (USPN. 5,403,711).

Duck et al. teach the catalytic hybridization comprising a nucleic acid probe with scissile linkage and an enzyme capable of cleaving the probe at scissile linkage after target-probe hybrid formation. Dervan et al. teach a triple helix formation during the target-probe hybridization. However, these references did not teach G-G quartet free multiplex structure, PCR amplified products as target nucleic acid, the probe to target ratio and the enzyme RNase H from E.coli.

Pinter et al. teach a method for the detection of nucleic acids using G-quartets wherein they disclose that G-quartets get disrupted in hybridization assays in the presence of complementary oligonucleotide probe sequence (see column 3, lines 55-67).

Walder et al. teach a method for catalytic hybridization amplification (CHA) wherein they disclose that (i) the cleavage reaction is catalyzed by the enzyme RNase H which is obtained from E.coli (see column 11, lines 9-29); (ii) the target nucleic acid can be obtained by

polymerase chain reaction (see column 14, lines 65-68 and column 15, lines 1-14). They also disclose that the target to probe ratio as 1:100 to 1:1000 (see column 11, lines 50-62).

Therefore, it would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made, to modify a method of catalytic hybridization with triple helix formation, CHA and G-quartets formation to achieve expected advantage of identification of nucleic acid sequence or variation in it based on the formation of multiplex structure. The motivation for this would have been an approach to detect formation of multiple helix structures in hybridization assays.

No claims are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suryaprabha Chunduru whose telephone number is 703-305-1004. The examiner can normally be reached on 8.30A.M. - 4.30P.M, Mon - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on 703-308-1152. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-0294 for regular communications and - for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Suryaprabha Chunduru
April 3, 2001

W. Gary Jones
Supervisory Patent Examiner
Technology Center 1600
4/4/01